The Bill Blackwood
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AN UNBIASED APPRAISAL OF POLICE MOTORCYCLES BASED ON COST, MAINTENANCE, AND OFFICER SAFETY

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ABSTRACT

The selection of a police motorcycle is critical to a police agency. Currently there is no single source that independently tests and reports on police motorcycles in a similar method as to the Michigan State Police testing police cars and Sports Utility Vehicles (SUV). The intent of this paper is to provide the police administrator information in comparing cost, operating and safety features that each manufacturer produces.

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INTRODUCTION

The purchase of police motorcycles by agencies that use these vehicles is a very important decision that should require a great deal of consideration based on fact. Currently there are no independent studies on police motorcycles to assist administrators in the selection of the most appropriate product. The purpose of this research paper is to present an unbiased opinion of the most practical choice of motorcycles for police use based upon a variety of information. This paper will include a comparison of the initial cost of the motorcycle along with the allied equipment to make it street ready. It will also include a comparison of the estimated maintenance cost over a three year period. Finally it will compare the motorcycles safety features, officer convenience features and if it will be adaptable to proposed tighter Environmental Protection Agency (EPA) Standards (Final report of the small, 2001). The paper will also include the manufacturer and model of motorcycle and the reason for its selection by larger cities across Texas and some smaller agencies in the Dallas/Ft. Worth area.

In an article by Strandberg (2002), he states that there are only four motorcycle manufacturers that produce a motorcycle that is dedicated to police use. The four manufacturers are Harley-Davidson, Kawasaki, BMW and Thunderworks. Thunderworks is more of an off-road motorcycle and will not be compared in this study. However, following the 2004 production year, Kawasaki Motors, will no longer produce the KZ1000 police motorcycle. According to a representative from Kawasaki Motors, if they decide to re-enter the police motorcycle market, a totally re-designed liquid cooled motorcycle will be introduced. Honda Motors are in the process of introducing the ST1100P police motorcycle in the United States. Honda has been selling this unit for police use in Europe for several years.

Initial cost of the motorcycle will be based on prices quoted by the motorcycle manufacturer. Included will be the cost of allied emergency equipment that may need to be added for a functional police motorcycle. It will consider leases as well as out right purchases.

The estimated maintenance cost will be calculated from maintenance quotes and parts prices from vendors that perform maintenance on police motorcycles. It will include scheduled maintenance, maintenance intervals, and replacement parts such as tires. The estimates will be based on a three year period.

Due to the fact that there are no independent tests of potential police motorcycles, the comparison of safety features and officer convenience will be base on data provided by the motorcycle manufacturer. It will include curb heights, weight and other pertinent information. New Environmental Protection Agency standards will be implemented on this type of motorcycles in two phases, 2006 and 2010 (Final report of the small, 2001).

A survey was prepared and numerous police and sheriff's departments that utilize motorcycles were contacted. A copy of the survey is available in the reference section.

The intention of this paper is to assist law enforcement agencies in making a qualified decision when selecting a police motorcycle. It is expected that there will be a difference in the cost of each motorcycle. But when beginning this study, there was no documentation comparing safety features. If there is a difference, this study will also determine if the agency size contributes in determining which is more compelling, price or safety. It is expected that the final selection will continue to be based on personal prejudices for or against a particular manufacturer.

REVIEW OF LITERATURE

The costs ranges of the motorcycles are as listed. These costs include the motorcycle, siren and emergency lighting. It does not include the costs of the radar, police radio, audio or video recorders, or other department specific equipment. BMW is delivered with the emergency lights, siren, and siren speaker already installed. The Harley Davidson is delivered with the front emergency lights only. The radio box, side and rear emergency lights, siren and siren speaker are options. The Honda is delivered with no emergency lights as part of the purchase price quoted. Prices for this emergency equipment are quoted from Squad Fitters Police Motorcycle Equipment, Inc. catalog.

MAKE	PRICE	WARRANTY
BMW	$17,900-18,900	3YR/36,000
Harley-Davidson	$14,800.00	2YR / UNLIMITED
Siren	$ 750.00	
Additional lights/box	$ 1,288.00	
Total	$16,838.00	
Honda	$12,000.00	3YR / UNLIMITED
Emergency kit	$ 1,950.00	
Total	$13,950.00	

Another option that some agencies are going to is leases. Using this option, the agency leases the motorcycle and affixes there own equipment that is not furnished by the motorcycle manufacturer. At the end of the lease period, the agency turns in the old motorcycle and either gets a new motorcycle or terminates the lease.

Make	term	cost	Includes
Harley-Davidson	1 year	$475 month	Motorcycle only
			Maintenance included

BMW	39 month	$400 month	fully equipped motorcycle
Honda	does not offer lease at this time.		

Maintenance costs on police motorcycles have been a concern for many Traffic Units. Larger motorcycle units that have their own maintenance and repair shop have not been as concerned as smaller units that have to send the motorcycles to a private repair shops. The manufacturer of the Kawasaki KZ1000 suggested a valve adjustment every 3,000 miles. The cost was for the adjustment was $321. The cost for only the valve adjustment on a KZ1000 that was driven 12,000 miles per year for 3 years would be $3,852. When comparing maintenance cost on the makes of motorcycles, there was a large difference in the cost. A comparison on full service and oil changes, their intervals, tires, cost, and the cost over a three (3) year/36,000 mile period was conducted. The tires replacement was calculated on 6,000 miles. With a maintenance cost quote from Plano Honda, Plano, Texas, Table 1 shows that the Honda would be the most economical with a 3 year estimate of $2,783.90. However, being a new product on the market, the complete maintenance cost may be under calculated due to lack of current available information.

TABLE 1
HONDA MAINTENANCE
COST

FULL SERVICE	1,000	MILES	$288.00
OIL CHANGE	4,000	MILES	$52.00
OIL CHANGE	8,000	MILES	$52.00
OIL CHANGE	12,000	MILES	$52.00
FULL SERVICE	16,000	MILES	$288.00
OIL CHANGE	20,000	MILES	$52.00
OIL CHANGE	24,000	MILES	$52.00
OIL CHANGE	30,000	MILES	$52.00
FULL SERVICE	32,000	MILES	$288.00

				$1,176.00
TIRES				
FRONT	TIRES	6,000	MILES	$99.88
	MOUNT			$42.38
REAR	TIRES			$129.88
	MOUNT			$49.44
FRONT	TIRES	12,000	MILES	$99.88
	MOUNT			$42.38
REAR	TIRES			$129.88
	MOUNT			$49.44
FRONT	TIRES	18,000	MILES	$99.88
	MOUNT			$42.38
REAR	TIRES			$129.88
	MOUNT			$49.44
FRONT	TIRES	24,000	MILES	$99.88
	MOUNT			$42.38
REAR	TIRES			$129.88
	MOUNT			$49.44
FRONT	TIRES	30,000	MILES	$99.88
	MOUNT			$42.38
REAR	TIRES			$129.88
	MOUNT			$49.44
				$1,607.90
TOTAL OVER THREE YEAR PERIOD			**$2,783.90**	

With a maintenance cost quote from BMW of North Dallas, Plano Texas, Table 2 shows that the BMW was second at $3,546.00. The information received from BMW appears to be an accurate service cost estimate.

TABLE 2
BMW MAINTENANCE COST

FULL SERVICE	600 MILES	$275.00
FULL SERVICE	6000 MILES	$250.00
FULL SERVICE	12,000 MILES	$300.00
FULL SERVICE	24,000 MILES	$325.00
FULL SERVICE	30,000 MILES	$250.00
FULL SERVICE	36,000 MILES	$300.00
		$1,700.00
TIRES		
FRONT TIRE	6000 MILES	$115.00

	MOUNT & BALANCE		$47.60
REAR	TIRE		$159.00
	MOUNT & BALANCE		$47.60
FRONT	TIRE	12,000 MILES	$115.00
	MOUNT & BALANCE		$47.60
REAR	TIRE		$159.00
	MOUNT & BALANCE		$47.60
FRONT	TIRE	18,000 MILES	$115.00
	MOUNT & BALANCE		$47.60
REAR	TIRE		$159.00
	MOUNT & BALANCE		$47.60
FRONT	TIRE	24000 MILES	$115.00
	MOUNT & BALANCE		$47.60
REAR	TIRE		$159.00
	MOUNT & BALANCE		$47.60
FRONT	TIRE	30,000 MILES	$115.00
	MOUNT & BALANCE		$47.60
REAR	TIRE		$159.00
	MOUNT & BALANCE		$47.60
			$1,846.00
TOTAL OVER THREE YEAR PERIOD			**$3,546.00**

With a maintenance cost quote from American Eagle Harley-Davidson, Corinth, Texas , Table 3 shows that the Harley-Davidson would be the most expensive at $5,474.50. This calculation is based on a complete service as recommended by the manufacturer. The recommended service includes a thorough inspection and routine preventative maintenance adjustments. The second calculation still shows Harley-Davidson as third. These figures include basic service cost totaling $4,579.50 over a three year period. Basic service appears to be a simple oil change.

TABLE 3
HARLEY-DAVIDSON
MAINTENANCE COST

SERVICE	MILEAGE	HARLEY RECOM SERVICE	BASIC SERVICE
FULL SERVICE	1,000 MILES	$273.00	$265.00
OIL CHANGE	2,500 MILES	$135.00	$75.00
FULL SERVICE	5,000 MILES	$278.00	$265.00

OIL CHANGE	7,500 MILES	$135.00	$75.00
FULL SERVICE	10,000 MILES	$401.00	$265.00
OIL CHANGE	12,500 MILES	$135.00	$75.00
FULL SERVICE	15,000 MILES	$278.00	$265.00
OIL CHANGE	17,500 MILES	$135.00	$75.00
FULL SERVICE	20,000 MILES	$408.00	$265.00
OIL CHANGE	22,500 MILES	$135.00	$75.00
FULL SERVICE	25,000 MILES	$278.00	$265.00
OIL CHANGE	27,500 MILES	$135.00	$75.00
FULL SERVICE	30,000 MILES	$401.00	$265.00
OIL CHANGE	32,500 MILES	$135.00	$75.00
FULL SERVICE	35,000 MILES	$278.00	$265.00
		$3,540.00	**$2,645.00**

TIRES				
FRONT	TIRE	6,000 MILES	$132.95	
	MOUNT & BALANCE		$49.00	
REAR	TIRE		$134.95	
	MOUNT & BALANCE		$70.00	
FRONT	TIRE	12,000 MILES	$132.95	
	MOUNT & BALANCE		$49.00	
REAR	TIRE		$134.95	
	MOUNT & BALANCE		$70.00	
FRONT	TIRE	18,000 MILES	$132.95	
	MOUNT & BALANCE		$49.00	
REAR	TIRE		$134.95	
	MOUNT & BALANCE		$70.00	
FRONT	TIRE	24,000 MILES	$132.95	
	MOUNT & BALANCE		$49.00	
REAR	TIRE		$134.95	
	MOUNT & BALANCE		$70.00	
FRONT	TIRE	30,000 MILES	$132.95	
	MOUNT & BALANCE		$49.00	
REAR	TIRE		$134.95	
	MOUNT & BALANCE		$70.00	
			$1,934.50	**$1,934.50**
OVER THREE YEAR PERIOD			**$5,474.50**	**$4,579.50**

There are notable differences in all of the referenced police motorcycles. The Harley-Davidson is driven by a belt whereas the BMW and Honda are shaft driven. The Harley-Davidson is air cooled and the BMW and Honda are liquid cooled. The

Harley-Davidson and the BMW both come with and adjustable seat and heated grips. The most notable difference is that the BMW is the only police motorcycle that offers ABS (anti-lock brake system) at this time. Honda offers ABS as an option on the ST1300 consumer model but not the police model at this time. An announcement by Harley Davidson, in a press release, on July 15, 2004 (Electronic) states that they will begin to offer ABS on the 2005 police motorcycles as an option. However, at this time there is no available information regarding pricing or test data.

Listed below are several comparisons of key specifications that police departments use in the selection of police motorcycles. The information was made available by the manufacturers, BMW (BMW, 2004), Harley-Davidson (Harley Davidson Road King, 2004), and Honda (Honda ST1100, 2004).

Specification	BMW	Harley	Honda
Displacement	1130cc	1450cc	1084cc
Horsepower	95@7,250	N/A	N/A
Torque	74 ft/lbs@5,500	86ft/lbs@3,500	N/A
Number of cylinders	V-4	V-4	V-4
Coolant	liquid	air	liquid
Ignition	Electronic	Alpha-Control	Digital
Fuel system	Elec. Fuel inject	Elec. Port Inject	4-carburetors
Fuel capacity	6.6 gallons	5 gallon	7.4 gallons
Clutch	1 dry/hydraulic	wet	hydraulic
Transmission	6 speed	5 speed	5 speed
Drive train	enclosed shaft	belt	enclose shaft
Battery (ies)	2	2	2
Brakes	dual f/1 rear	dual f/1 rear	dual f/ 1 rear
ABS	standards	optional (2005)	optional
Ground clearance	6”	5.1”	5.8”
Wet weight	695lbs	723 lbs	655 lbs

Top speed	120+MPH	100 MPH	N/A
Adjustable windshields	yes	no	no
Heated grips	yes	yes	optional
Adjustable levers	yes	no	yes
Siren include	yes	no	no
Front/rear LED lights	yes	front only	no
Crash bars	yes	yes	molded in
Fuel grade	regular	premium	regular

METHODOLOGY

The Michigan State Police has become an authority in testing and evaluating police vehicles. Their published reports are used by many agencies regarding the selection of police cars and sports utility vehicles. However, neither they nor any other group currently test police motorcycles. The intent of this study is to assist agencies in selecting a police motorcycle through an unbiased viewpoint. The comparison will be based on cost, maintenance and safety/ operational features.

It is suspected that most agencies do not use the included data in the selection of their police agency. It is suspected that the agencies base their decision on the wants of the officers, the appearance of the motorcycle, or possibly the availability of service. It is also suspected that some of the agencies select motorcycles with regard to initial cost as opposed to overall cost or safety concerns.

The motorcycle manufacturer's websites, publications, and advertisements were used to compile the data in this paper. The Allen Police Department also obtained demonstrator motorcycles from Honda and from BMW. A survey was developed and numerous agencies were contacted by phone for their input. Numerous law enforcement

personnel were interview for their opinions and solid facts were requested. Several agencies in and around the Dallas-Ft. Worth metro-plex and the Austin Police Department were contacted. Some of the agencies had as few as 1 motorcycle and the Austin Police Department having 60 police motorcycles. Much of the interviews were conducted with motor officers due to not being able to contact most of the supervisors for an official questionnaire.

The research data that was collected will be processed so that the reader can use it to verify this papers conclusion in determining a motorcycle that best fits the needs of their agency. Readers can also use the data to create their own conclusion or justify budget proposals.

FINDINGS

Kariya (2004) states that motor officer are usually true to the make and model that they ride on duty. Kariya (2004) states that the motor officers have a “near-dogmatic opinion” regarding their make of motorcycle and that “nobody will ever change his or her opinion” (p. 24). However, with Kawasaki ceasing to produce the KZ1000 police motorcycle, many officers and agencies will have to select a replacement vehicle. The KZ1000 had become an icon as the police motorcycle. Many citizens that may have not have had police motorcycles in their community could recognize the KZ1000 as the motorcycle on the TV show “CHiP’s”. Kawasaki though had produced the same motorcycle for decades without making any technological changes. In one sense larger agencies could routinely change over equipment from an old unit to a new unit and not have to make or purchase any additional items. But the company did not make any

changes to the engine, brakes, electrical system and would not have met the new EPA (Environmental Protection Agency) standards.

Harley-Davidson has been in the police motorcycle business longer than any manufacturer. Strandberg (2003) reported that “Harley-Davidson motorcycles have been a part of policing since shortly after the company was founded in 1903, 100 years ago this year” (p. 26). They also have had few design changes including modifying their emissions standards. The President of Harley-Davidson Motor Company, Jim McCaslin, stated in an internet report that he company “plans to meet the requirements of the proposed EPA standards and still make motorcycles true to the look, sound and feel that you know and love” (McCaslin, 2004). “Harley-Davidson delivery of police motorcycles to law enforcement agencies is in line with other law enforcement vehicles. Harley Davidson has been a staple in the police motorcycle industry and will be around for years to come.”

BMW began its contribution to law enforcement in Europe and has been very influential in the US market. In fact, “Internationally, BMW is the largest seller of motorcycles for authority use” (American Motorcycle Network, 2001). The BMW has over “80,000 units in over 150 countries”. They were the first and only manufacturer of police motorcycles to add an Anti-Lock Brakes System to their police motorcycles as a standard feature. The BMW is faster than the Harley-Davidson and has a shorter turning radius. The BMW currently meets all EPA standards and including the ones that are proposed. Delivery of the motorcycles is in line with other law enforcement vehicles. BMW has also been a staple in the police motorcycle industry and they too will be around for years to come (*American Motorcycle Network* (AMN), 2001).

Honda is new to the United States law enforcement law enforcement motorcycle market. They have been very successful in the European and Asian markets. Honda has a very good reputation in the private sector in that their motorcycles are reliable, cost effective and easy for the consumer to work on. Agencies in the United States that use the Honda ST1100P, though few at this time are very satisfied with the product. An article in the *Honda Riders Club of America*, 2004, March/April addition titled "Everything's coming up roses… and Honda ST1100Ps" (p. 16) stated that the Pasadena (California) Police Department had taken delivery of 9 of the ST1100P's for the Tournament of Roses parade. A Lieutenant with the Pasadena Police Department was contacted and he advised that they had been very satisfied with the motorcycles. He stated that several of his officers that were currently riding Harley Davidson motors had requested one of the Honda's after test riding the motorcycle. Maneuverability and acceleration was a major factor in the request to switch to the Honda. One concern with the Honda ST1100P is delivery. Sources at North American Honda in Dallas, Texas advised that after the motorcycle is ordered it will be produced at a future date. Another problem is that Honda has ceased production of the ST1100P in the European and Asian markets. They are now producing the ST1300P for these markets. Though no official explanation is available, it appears that Honda has many of the ST1100P engines produced. The length of availability of the ST1100P may be as long as it takes to exhaust their supply. Honda will not acknowledge that the ST1300P will be available in the US market.

To purchase or lease the police motorcycles is a major question that each agency has to determine. Some agencies feel that it is to their advantage to lease the vehicles as opposed to purchasing them. Some cities or counties are opposed to leases

or in some instances funds require the purchase of equipment. The Harley-Davidson lease plan gives the officer assigned to the motorcycle first chance at purchasing the motorcycle. Some agencies have policies that might place that officer in jeopardy of violating that policy. There is actually a third option, leasing the motorcycles from the motor officer. With this option, the motor officer purchases and outfits the motorcycle of his choosing and then leases it back to the agency in which he/she works. There are pro's and con's to this choice however this option will not be covered. This option could possibly be the idea of another study.

The first consideration will be the purchase of the motorcycle. Taking into consideration the purchase price of the motorcycle, equipping the motorcycle with emergency lights, and adding in the estimated maintenance cost over a three year period, the Honda shows to be the most economical at a cost of $16,774. In second place is the Harley-Davidson. The cost is estimated at $21,863 using recommended maintenance or $20968 using the basic maintenance. BMW was the highest at $22,046. As shown in TABLE 4, the cost difference between the Harley-Davidson and the BMW is only $183 if the agency follows the Harley recommended service plan and 1,079 using the basic maintenance plan. The cost difference is much greater between the Harley-Davidson recommended service $5,129 and the basic service $4,434 and the Honda. The difference between the Honda and the BMW is $5,312.

TABLE 4
MOTORCYCLE PRICE DIFFERENCES

BMW	$22,046	DIFFERENCE
HARLEY (recommended)	$21,863	$ 183
HARLEY (basic)	$20,968	$1,079
HONDA	$16,734	$5,312

HARLEY (recommended)	$21,863	
DIFFERENCE		
HONDA	$16,734	$5,129
HARLEY (basic)	$20,968	
HONDA	$16,734	$4,434

The second thing taken into consideration is a lease plan. To fully compare a lease to a purchase, the agency has to compare it identically to a purchase. This would require the agency to figure the cost of a lease over a three (3) year period if that is the length of a purchase. As shown in Table 5, the cost to lease a BMW, with added graphics and tires for a 39 month lease would be $17,596 plus $3,546 for a total of $21,142. The cost to lease a Harley-Davidson would be $8,962 for the first year. But taking into consideration the Harley-Davidson over a three year period, the cost would be $22,810. The leases do not cover tires. With the Harley-Davidson, the agency would obtain a new motorcycle each year. The first year the agency would have to purchase a radio box, rear lights, siren and siren speaker. The following years, the agency would only have to pay to have the equipment transferred from the used motorcycle onto the new motorcycle.

TABLE 5
MOTORCYCLE LEASE OPTIONS

Harley-Davidson		BMW
$475	COST PER MONTH	$400
X12	LEASE TERM	X39
$5,700	TOTAL / TERM	$15,600
$ 774	TIRES / TERM	$ 1,846
$6,474	SUB-TOTAL	$17,446
$ 150	GRAPHICS	$ 150
$6,624	SUB-TOTAL	$17,596
$ 300	INSTALL EQUIP	$ 3,546
$6,924	SUB-TOTAL	
$2,038	EQUIPMENT	
$8,962	FIRST YEAR	

$ 6,924	1 YEAR	
X3	3 YEAR COMPARISON	
$20,772	SUB-TOTAL	
$ 2,038	EQUIPMENT/ 3 YEAR USE	
$22,810		$21,142

One very important item, probably the most important item, an agency needs to take into consideration, is whether to purchase motorcycles with an Anti-Lock Brake System (ABS). Lieutenant Boydstin, of the Austin Police Department, advised that on the bid specifications for the 2003-2004 budget year, manufactures were required to offer the ABS before they could bid. Previous to this, Austin Police were using Harley-Davidson exclusively. They are currently switching over to the BMW motorcycles and have approximately 1/3 of the motorcycle fleet converted. Lieutenant Boydstin had received information that Harley-Davidson was planning to introduce an ABS as an option. No further information was available at this time for any future speculation. The California Highway Patrol (CHP) switched to the BMW starting in 1998 with 131 Units and another 380 in 1999 and 2000 ("The Story Behind the BMW Motorcycle," 2001). After the CHP conducted test on the BMW with ABS, ABS was added to the motorcycle specifications. Kawasaki and Harley-Davidson did not have an ABS to offer. Honda had ABS available but choose to stay out of the market ("First Multi-Year Contract," 2000). During a conversation with Retired Sergeant Chuck Downing, from the California Highway Patrol, there has not been one traffic related fatality accident within the CHP since the department went with the BMW with the ABS. Many agencies have added the ABS to the patrol car bid specifications due to their field proven advantages over non-ABS vehicles. Officer Don Biava, of the CHP Academy Motorcycle Unit, stated "if a rider panics and reacts, the possibility of locking up the front wheel due to overbraking may

occur, causing the motorcycle to go down". According to Biava, the ABS removes "the panic factor" ("The Story Behind the BMW Motorcycle," 2001). BMW offered a free one day demonstration of the police motorcycles in Austin, Texas in May of 2004 at an abandoned airport. Two officers from the Allen Police Department were sent to the demonstration. The Allen Police Department currently operates Kawasaki KZ1000s. One of the officers is an avid motorcycle enthusiast. Both officers' have been a motor officer for 3 years. One of the demonstrations was to build up speed and while going through a large wet track and emergency brake. The avid rider owns a BMW but had never tested it in this fashion. The other officer had never operated a motorcycle with ABS. Both officers were very impressed with the braking ability of the ABS. The non-avid rider stated that his Kawasaki would have never withstood the braking and he would definitely have "gone down."

In the past, electrical problems have plagued motor officers. The advent of LED emergency lighting technology has all but eliminated the problem. The BMW and the Harley-Davidson though still come equipped with two (2) batteries, one to operate the motorcycle and one to operate the allied equipment. The BMW R1150 RT-P (police package) comes with a Code 3 LED emergency lighting package. The Harley-Davidson comes equipped with two front incandescent emergency lights. All other lights must be purchased and installed separately. The Honda is designed to use the LED lights. According to a representative from 911EP, an LED emergency light manufacturer, they are attempting to negotiate and agreement to outfit the Honda with a specific LED package.

Another topic that is usually brought up in a circle of motor officers is the clutch system. The Kawasaki, Harley-Davidson and the Honda all have a wet or hydraulic clutch. The BMW has a dry clutch. The wet or hydraulic clutch is designed to work with the engine oil as a coolant. This allows the officer to slip the clutch to maintain balance at low speeds. The dry clutch system is feared to "burn the clutch up" when slipped. According to BMW, transitioning to the dry clutch is only a matter of getting use to it and that it can be slipped to maintain slow speed balances. BMW is also so convinced that these officers can convert to the dry system and states that the first clutch is free. Lieutenant Boydstin of the Austin Police Department stated that all of the officers that switched over to the BMW adapted to the dry clutch and that APD had not had a single clutch replaced.

Officer convenience is another item that was found to be more a personal choice. BMW and Harley both come equipped with an adjustable seat and heated grips. Officers that rode the Honda that are now on Kawasaki's' stated that the adjustable seat was not that big of a deal. They added that the heated grips could be added later. Many of the officers liked the way that the side storage compartments opened on the Harley-Davidson. Many of the same officers liked that the BMW side compartments could be removed. Many of the officers enjoyed BMWs cockpit and some like the Harley-Davidsons simple and true gauges.

After interviewing many motor officers, Kariya's article in Police Magazine was found to be true. Most officers were true to their manufacturer. During interviews it was noted that the younger officers were more likely to admit that they liked something different on another make that the older officers. One McKinney motor officers

commented that he liked the acceleration and maneuverability of the BMW but that it was too quiet. He stated that he “liked that rumble under him”. One veteran Plano motor officers stated that he had ridden a Harley for a while. He liked it as a touring bike, but stated that it was too heavy and would not accelerate fast enough for him. At the end of day, he said, “I was worn smooth out”. The Dallas Police Department is not making a decision anytime soon. According to Sergeant Fred Kattani, DPD ordered 24 of the last Kawasaki KZ1000 to be produced. Delivery will be the end of 2004 or beginning of 2005. This will allow them time to study the makes better before making such a drastic change.

Some of the other comparisons show that the Harley-Davidson requires premium grade fuel where the Honda and BMW use regular. The clutch and brake levers on the BMW and Honda are adjustable so that the operator can fit the levers to their personal hand size. The Harley-Davidson has fixed levers. The weight difference shows that the Harley is 68 pounds heavier than the Honda and 28 pounds heavier that the BMW. One additional factor is that the BMW comes complete except for the radio, the Harley needs to be outfitted with the radio, and radio box and all rear mounted emergency lights which would add weight.

The Harley-Davidson has an Alpha Controlled ignition system. When the officer has killed his engine and locates a violator, after turning on the key, it takes up to 5 seconds before he can start the engine according to one of the McKinney motor officers that rides a Harley. The Harley is air cooled, so when sitting still, the officer has to kill the engine to keep it from overheating. The BMW is fuel injected and the Honda is carbureted and both start instantaneous.

CONCLUSIONS

With no published comparison of police motorcycles it is hard for administrators to have enough unbiased information to make an educated choice of the best police motorcycle for their agency. The law enforcement agency will have to determine which option will out way their decision, cost, convenience or safety. From all appearances though, some of the decisions will be based strictly on one person's preference for one make. Allen Police Department Captain Robert Flores attended the Leadership Command College Alumni Association conference in June, 2004. He was very impressed by one of the guest speakers that spoke regarding the safety record of Anti-Lock Brake Systems on motorcycles. He also spoke of the legal implications regarding providing the safest equipment available. The Captain explained what a dynamic speaker this man was and how convincing he was. He stated that after this presentation that he would support any manufacturer that had as reliable ABS as BMW does. He stated that during a break, a Captain from another Dallas-Ft. Worth agency that had just switched over to Harley-Davidson stated that his men did not need the ABS. This gives the appearance that this Captain selected a make that he enjoyed or liked over any safety issues or convenience items.

It is a proven fact that all three of the manufactures make a reliable product. Each make has its own unique features. It appears that for traffic enforcement where the violator does not have an open area, the Harley-Davidson is sufficient. However, if quick acceleration is required, the Honda or BMW would be most desirable. One might ask why acceleration is such an important factor. An officer that is attempting to over take a violator with a low acceleration motorcycle will have to accelerate longer and eventually go much faster than the violator to catch up with him. For highway enforcement, the

Harley Davidson's slower acceleration requires the officer to accelerate harder for a longer period of time. I was advised by a deputy that after clocking a speeder on an Interstate Highway at 90 MPH, it took him 3 miles to overtake the violator.

For motor units that used "patrolling parks" in the justification for the units' existence, the Harley-Davidson Road King has only 5.1 inches of ground clearance. This means that the Harley-Davidson cannot jump a standard street curb and requires the operator to find some sort of ramp before entering a sidewalk or park. The Honda shows 5.8 inches of ground clearance. When testing the Honda ST1100P, the height was enough to jump up and down the curbs. The BMW R1150RT-P has 6 inches of ground clearance. When testing the motorcycle on curbs, the height was more than sufficient to go up and down any curbs in our area. In communities where there are many miles of divided thoroughfares, many with large grassy medians, this could become an issue. Many times when an officer needs to turn around on a violator traveling in the opposite direction, the motor officer has to jump the curbs to turn around on them. Selecting the Harley Davidson would require the officer to travel to the next turn around before beginning the pursuit of the violator.

When testing the BMW and the Honda against the Kawasaki and Harley-Davidson, the Kawasaki was still the tightest turning and most maneuverable motorcycle of the bunch. Most officers rated the BMW as second, the Honda third and the Harley-Davidson last. The officers that regularly ride the Harley's are very proficient on them. However, the patterns are widened for the obstacle course for the Harleys.

The overall cost between a Harley Davidson Road King and the BMW R1150RTP when considering the cost and maintenance over a three year period are very close. The individual department will have to decide if quick acceleration is important to the

function of the unit. The major difference and probably the most important is the Anti-lock Brake System which applies to the officers' safety. The California Highway Patrol operates over 600 BMW motorcycles and has since 1998.They have not had a single officer killed in the line of duty as a result of a motorcycle crash during this time period.

This paper was intended to be an unbiased appraisal of the available motorcycles to law enforcement. All research was examined with that in mind. Most of the data is presented so that the reader can make his own determination. But with BMW available with a tried and true Anti-Lock Braking System as a standard feature, it is hard for this paper to remain unbiased. Officer safety is something that agencies across the country study and worry about on a daily basis. Not only from a liability stand point, but from a true caring about the safety and welfare of the officers. Many officers are issued body armor, we purchase cars and SUV's with anti-lock brakes, we install transport cages to protect the officers transporting prisoners and the latest issue is how to protect our officers from fire on rear impact collisions. If only one motor officers' life is saved by someone reading this study and selecting the safety features, this paper will be a success. Of course there are exceptions to the rule. When speaking to an officer in Lindale, Texas (near Tyler) regarding the choices of motorcycles and their pro's and con's. He advised that the BMW sounded the safest but that it would not be an option. The closest BMW dealership to him would be Dallas or Shreveport, Louisiana. Therefore, availability of service would probably be the primary issue of some agencies.

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